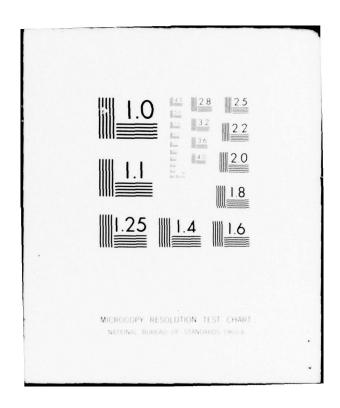
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RESOURCES

**DEVELOPMENT OF FACTOR-REFERENCED SUBSCALES** FOR THE VOCATIONAL INTEREST-CAREER EXAMINATION

By

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PERSONNEL RESEARCH DIVISION **Brooks Air Force Base, Texas 78235** 

Interim Report for Period January 1975 - January 1976

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This interim report was submitted by Personnel Research Division, under project 7719, with HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235. Mr. William E. Alley, Demographic and Attitudinal Research Branch, was the principal investigator.

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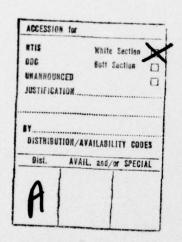
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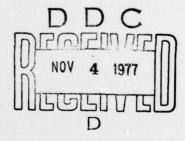
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# PREFACE

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# DEVELOPMENT OF FACTOR-REFERENCED SUBSCALES FOR THE VOCATIONAL INTEREST-CAREER EXAMINATION

#### I. INTRODUCTION

Without considerable experience in the civilian labor market, it is often difficult for prospective Air Force enlistees to select the most appropriate vocational or technical career. The process of matching the right person with the right job requires careful consideration of the recruit's interests and abilities in relation to the wide range of jobs typically available at the entry level. This is particularly true in view of the fact that initial assignment contracts are binding for a minimum of 4 to 6 years.

Some of the uncertainty in these decisions is reduced through the use of systematic aptitude assessment which delimits those jobs for which the recruit is mentally qualified. Moreover, the needs of the service may further restrict job availability. Once these constraints are met, however, the recruit may still have considerable latitude to choose among several competing occupations without first-hand knowledge of the jobs or the duties involved.

Given the informality with which vocational preferences are considered in the current job-placement system, it is understandable that each year a large number of recruits enter career fields that are inconsistent with their personal interests. The resulting dissatisfaction leads a certain proportion of these people to retrain into other specialties while those obligated to remain in dissatisfying careers are more likely to separate from service prematurely. In either case, additional personnel costs associated with recruiting, processing, and training replacements are incurred.

In 1973, a research program was initiated to improve the quality of vocational guidance and job placement procedures in the Air Force. The specific objectives were to develop a standardized assessment system for measuring vocational interests at point of entry and to evaluate the utility of this information in the selection of an appropriate vocational or technical career field. Initial efforts to construct a suitable instrument for the project were performed under contract with the Educational Testing Service (Echternacht, Reilly, & McCaffrey, 1973). This work led to the development of a general purpose vocational interest inventory designated the Vocational

Interest Career Examination (VOICE). The purpose of this report is to document the construction of factor-referenced homogeneous subscales for the inventory.

The utility of homogeneous scaling has been well documented in past research (Campbell, Borgen, Eastes, Johansson, & Peterson, 1967; Clark, 1961; Kuder, 1942). Given a large number of individual item responses that may be difficult or cumbersome to interpret, it is often desirable to seek some means for summarizing the information using a relatively few descriptive indices. The number and nature of these indices are determined by examining relationships between items, clustering those which seem to measure the same underlying dimension. This approach is analogous to factor-analytic methods which seek to identify common underlying factors among a number of different measurements.

The present study was designed to circumvent several potential problem areas typically encountered in this type of research (see Buros, 1975, for a review of this literature). The initial item pool was sufficiently broad to cover a wide array of vocational and technical interests. Item responses were obtained in the free-, rather than forced-choice format to preclude difficulties with ipsative scoring. Sample sizes were large and differentiated on the basis of sex to permit stable generalizations for both male and female respondents. And finally, rigorous factor-analytic methods were used to provide a sound and replicable basis for the analysis. Specific attention was directed to the following issues: (a) identification of the basic interest dimensions underlying individual item responses to the VOICE, (b) construction of integer weighted subscales to replicate the dimensions, (c) evaluation of the subscales for suitable psychometric properties, and (d) concurrent validation of the scales with other Department of D e interest inventories.

# II. VOICE FACTOR STRUCTURE

#### Item Pool

The basic data for the analysis consisted of individual responses to the VOICE. The inventory contains 400 multiple-choice items divided into

four general categories: job titles, work tasks, spare time activities, and desired learning experiences. The respondent is asked to indicate relative preferences for each item in a standard like-indifferent-dislike format. Total testing time for completing the inventory is approximately 35 minutes.

# Subjects

The inventory was administered to random samples of male (N = 10,035) and female (N = 12,710) recruits during 1973-74 at Lackland Air Force Base, Texas. Subjects ranged in age from 17 to 26 years; most had completed high school or some college. In general, they were representative of all-volunteer recruits entering the Air Force during that time period. Female recruits, which currently represent approximately 13% of accessions, were deliberately over-sampled to obtain sufficient numbers of responses from this group.

## **Factor Analyses**

To establish the factor structure of the inventory, item intercorrelation matrices (400 x 400) were generated separately for the male and female samples. Item responses were coded 3 = like, 2 = indifferent, and 1 = dislike. Each of the matrices was subjected to a principal axis factor analysis with varimax rotation (Veldman, 1967). Various extraction limits were examined to determine the appropriate number and character of the resulting factors. Limits were set to provide 16, 21, 26, and 35 varimax factors.

Results of these analyses were virtually identical for the male and female subgroups at each extraction level. Moreover, the factors extracted at lower limits within each sample appeared to be invariant as more and more factors were extracted and rotated. In the process, 18 orthogonal factors were identified and labeled as shown in Table 1. These factors represented 48% of the original variance in the male sample and 46% in the female sample. The most consistent factors, labeled I through XII in the table, could be seen in the 16-, 21-, 26-, and 35-factor solutions. The remaining factors were most evident in the 26-factor solution as factors XIII through XVIII and XXVI. Representative items for each of the 18 factors are shown in the table together with factor loadings obtained in the male and female subsamples. The order in which the factors are shown corresponds to the degree to which each factor encompassed smaller and smaller item

clusters. The first factor (Office Administration), for example, had more than 60 items in the inventory with associated loadings above .30. The last factor (Automated Data Processing), on the other hand, had approximately seven items above this minimum cutoff.

#### III. SCALE DEVELOPMENT

Although it would be possible to compute factor scores for each respondent as a means for describing his interests, to do so would not be convenient from an operational point of view. Each score would represent the weighted composite of 400 item responses, each contributing uniquely to the system. The processing of these scores would require access to computing machinery which might not be readily available to the general user.

To simplify scoring individual profiles, an attempt was made to construct integer-weighted subscales which could serve in lieu of the more complex scoring system. These scales would represent the summation of a relatively few items per scale and could be obtained by hand if necessary. Following more or less traditional guidelines, the factor loadings for items within each dimension were rank ordered from highest to lowest. Items were selected to represent a given dimension beginning with those with the highest loadings and continuing until one of two criteria were met: (a) A maximum of 20 items was selected or (b) Item loadings fell below an arbitrary minimum cutoff of .30. As a check on the procedure, supplementary analyses were performed to examine the correspondence between the integer-weighted subscales and their factor score equivalents. Correlations shown in the first column of Table 2 represent the simple bivariate relationships between factors and corresponding scales. The second column reflects the multiple R obtained using all unit-weighted subscales in combination to estimate each of the factor scores.

Scores obtained on the Office Administration subscale, for example, correlated .94 with the corresponding factor score. The use of additional subscales increased the correlation to .97 accounting for approximately 94% of the factor-score variance. The bivariate R's ranged from a high of .94 to a low of .49. The multiple R's were all above .90 with the exception of three factors. Across all factors, the amount of information loss resulting from unit-weighted

Table 1. Orthogonal Interest Factors

			r Loading
	Factor/Representative Items	Male	Femal
1	Office Administration		
	Keep personnel records on employees	.74	.70
	Organize a file system for an office	.72	.73
			200
	Take inventory for a department store	.70	.66
П	Electronics		
	Find a problem in an electric circuit and fix it	.79	.80
	Test television tubes	.72	.73
	Technician (electronics)	.72	.69
III	Heavy Construction		
	Pour concrete for highway construction	.69	.61
	Operate a bulldozer or power shovel	.64	.58
	Construction worker	.62	.55
IV	Science		
	Write a scientific report	.65	.68
	Work in a scientific laboratory	.79	.82
	Use chemical laboratory apparatus	.75	.77
V	Outdoors		
100	Go canoeing	.60	.58
	Learn survival techniques		
		.61	.48
	Spend a week at the seashore	.67	.61
VI	Medical Service		
	Perform physical therapy	.59	.62
	Assist a surgeon during an operation	.60	.73
	Dental hygienist	.55	.57
VII	Aesthetics		
	See a Broadway play	.48	.50
	Read Shakespeare's plays	.59	.57
	Listen to an opera	.61	.66
		.01	.00
/111	Mechanics	and the	
	Tune-up a car	.66	.51
	Adjust the brakes on an automobile	.61	.46
	Supervise work in a garage	.44	.29
IX	Food Service		
	Work as a short-order cook	.62	.62
	Manage a cafeteria	.45	.54
	Chef	.65	.70
x	Law Enforcement	walls the s	madi - I
*	Highway patrolman	71	.68
		.71	
	Private investigator	.56	.52
	Prison guard	.56	.52
XI	Audiographics		
	Photographer	.65	.69
	Operate a 16mm movie camera	.62	.67
	Operate a Tollilli lilovic calliera	.02	

Table 1. Orthogonal Interest Factors

		Facto	r Loading
261	Factor/Representative Items	Male	Female
XII	Mathematics		
	Solve arithmetic problems	.67	.75
	Algebra	.61	.67
	Devise short-cut methods for adding numbers	.48	.52
XIII	Agriculture		
	Farmer	.54	.57
	Work as a game warden	.47	.55
	Train animals	.41	.54
XIV	Teacher/Counseling		
	Listen to people's problems and try to help them	.40	.53
	Give on-the-job training	.35	.48
	Teacher	.36	.49
XV	Marksman		
	Gunsmith	.55	.55
	Go deer hunting	.48	.53
	Teach marksmanship	.48	.46
XVI	Craftsman		
	Tailor	.35	.56
	Jeweler	.30	.30
	Watchmaker	.34	.24
XVII	Drafting		
	Draw graphs	.52	.50
	Draw maps from photographs	.48	.49
	Draw a topographical map of the US	.46	.46
XVIII	Automated Data Processing	and the state of the state of	
	Computer operator	.70	.77
	Computer programmer	.70	.77
	Keypunch operator	.45	.53

Table 2. Relationships Between Orthogonal Interest Factors and VOICE Subscales<sup>a</sup>

		Correl	ationsb
	Factor	Corresponding VOICE Subscale (R)	All VOICE Subscale Combined (Mult R)
1	Office Administration	.94	.97
II	Electronics	.94	.98
III	Heavy Construction	.88	.96
IV V	Science	.87	.96
V	Outdoors	.83 .79	.93
VI	Medical Service	.79	.97
VII	Aesthetics	.73 .73	.93
VIII	Mechanics	.73	.95
IX	Food Service	.79	.97 .93 .95 .96 .95 .93
X	Law Enforcement	.84	.95
XI	Audiographics	.84 .72	93
XI XII	Mathematics	.71	. 94
XIII XIV XV	Agriculture	.69	.94 .92 .80
XIV	Teacher/Counseling	Storag and .69	80
XV	Marksman	.69	.86
XVI	Craftsman	.49	.71
XVII	Drafting	.69	.71 .90
XVIII	Automated Data Processing	.65	.90

bConclations indicate the extent of relationship between interest factors, corresponding VOICE subscales (Col 1), and all VOICE subscales combined (Col 2).

scoring (approximately 15%) was considered to be within acceptable limits.

#### IV. SCALE CHARACTERISTICS

Summary statistics for the VOICE subscales are presented in Table 3. For each scale, the table catalogs the number of items, score range, raw score means and standard deviations by sex group, and internal item consistencies (Cronbach, 1951). As can be noted in the table, the scales range in length from 7 to 20 items. With few exceptions, the internal consistencies (for both the male and female subgroups) range from the high 80's to mid 90's. A comparison of male and female average raw score values indicates that males typically scored higher on Electronics, Heavy Construction, Mechanics, Law Enforcement, and Marksman subscales. Female respondents, as a group, typically scored higher on Office Administration, Medical Service, Aesthetics, Food Service, Audiographics, Agriculture and Teacher/Counseling.

Individual items contained in each scale together with associated item statistics for the male and female subgroups are shown in Appendix A (Table A1).

# V. RELATIONSHIPS WITH OTHER DOD INVENTORIES

Recent emphasis on developing common testing procedures across services provided a rationale for analyzing the concurrent validity of the VOICE with respect to comparable instruments from both the Army and Navy. A reference sample consisting of 1,390 recruits (87% male; 13% female) was administered the Navy Vocational Interest Inventory (NVII), the Army Classification Inventory (ACI), and the VOICE. The NVII contains 190 forced-choice item triads that require respondents to select the most and least preferred alternatives presented with each item. As shown in Table 4, the inventory yields nine area scores of the same general type 2 the 18 homogeneous VOICE

Table 3. VOICE Subscales

			Males	(N = 10,03	5)	Female	s (N = 12,7	/10)
Scale	No of Items	Score Range <sup>a</sup>	×	SD	αb	x	SD	αb
Office Administration (OA)	20	20-60	32.32	10.71	.95	37.85	11.46	.95
Electronics (EL)	20	20-60	40.72	12.78	.96	32.50	12.15	.96
Heavy Construction (HC)	20	20-60	34.41	9.99	.93	27.49	8.37	.93
Science (SC)	20	20-60	38.02	12.69	.96	38.21	12.81	.96
Outdoors (OD)	15	15-45	36.47	6.88	.88	36.67	5.76	.83
Medical Service (MS)	20	20-60	33.38	10.55	.94	40.81	11.47	.94
Aesthetics (AE)	15	15-45	26.10	7.74	.90	31.78	7.36	.88
Mechanics (ME)	15	15-45	31.65	8.98	.94	25.10	8.69	.94
Food Service (FS)	15	15-45	21.36	6.30	.90	26.72	7.40	.90
Law Enforcement (LE)	15	15-45	29.22	7.30	.88	26.90	6.89	.86
Audiographics (AU)	10	10-30	20.76	5.79	.90	22.26	5.45	.88
Mathematics (MA)	12	12-36	21.50	7.37	.93	22.06	7.44	.92
Agriculture (AG)	15	15-45	28.00	7.15	.88	31.04	8.00	.90
Teacher/Counseling (TC)	10	10-30	19.32	5.73	.89	22.22	5.31	.86
Marksman (MK)	7	7-21	15.38	4.28	.86	11.54	4.22	.86
Craftsman (CF)	7	7-21	9.88	2.95	.79	11.22	2.96	.72
Drafting (DF)	7	7-21	13.25	4.20	.85	13.08	4.28	.86
Automated Data Processing (DP)	7	7-21	13.76	4.49	.89	13.86	4.39	.88

<sup>&</sup>lt;sup>a</sup>Items scored 3 = Like; 2 = Indifferent; and 1 = Dislike; missing or otherwise invalid responses recoded = 2.

bAlpha coefficient of internal consistency (uncorrected).

Table 4. Means and Standard Deviations for the VOICE, NVII, and ACI on a Sample of Air Force Recruits (N = 1,390)

				N'	VII						
VOICE			Lambda Scores		I Share	Area Soo	res		ACI		
Scale	X	SD	Subscale	x	SD	Subscale	x	SD	Subscale	×	SD
Office Administration	33	10	Quartermaster	.33	.16	Mechanical	47	9	Combat	18	3
Electronics	42	13	Sonar Technician	.34	.22	Health	53	9	Mechanical	13	5
Heavy Construction	36	10	Electronics Technician	.32	.23	Office	49	8	Electronics	10	5
Science	40	12	Radioman	.33	.18	Electrical	49	9	Administrative	10	3
Outdoors	38	6	Data Processing	.29	.14	Food Service	50	9			
Medical Service	35	10	Store Keeper	.17	.13	Carpentry	47	8			
Aesthetics	27	7	Commissary Man	.24	.14	Sales Office	53	7			
Mechanics	33	9	Engine Man	.30	.26	Clean Hands	50	7			
Food Service	23	6	Boiler Man	.30	.26	Outdoors	45	8			
Law Enforcement	30	7	Electrician's Mate	.32	.25						
Audiographics	22	5	Equipment Operator	.31	.24						
Mathematics	23	7	Aviation Ord Man	.33	.23						
Agriculture	30	7	Air Control man	.34	.17						
Teacher/Counseling	20	5	Aviation Electrician	.33	.24						
Marksman	16	4	Hospital Corpsman	.20	.17						
Craftsman	10	3									
Drafting	14	4									
Auto D. P.	14	4									

subscales. An alternate scoring procedure developed by Dann and Abrahams (1973) yields occupational composites in 15 Navy specialties designated "lambda" scores. The Army's Classification Inventory, as used in their operational selection and classification program, provides interest measures in four general areas: Combat, Mechanical, Electronics, and Administrative. The item format in the ACI is free-response as in the VOICE. Means and standard deviations for the Air Force recruit sample across all three inventories are also shown in Table 4.

Correspondence between inventories was evaluated in two ways. First, simple bivariate correlations between individual VOICE subscales and those of the NVII and ACI were obtained to examine one-to-one relationships among the subscales. Second, a series of multiple correlation analyses were performed to determine the extent to which all scales in a given inventory could be used to replicate individual scales found in another. Six such analyses were conducted as follows:

Predictors		Criteria
VOICE (18)	VS.	NVII-Lambda (15)
NVII-Lamdba (15)	VS.	VOICE (18)
VOICE (18)	VS.	NVII-Area (9)
NVII-Area (9)	VS.	VOICE (18)
VOICE (18)	VS.	ACI (4)
ACI(4)	VS.	VOICE (18)

Split sample cross-validations were also performed within each set as a check for over-fitting.

Results of the bivariate correlation analyses, as shown in Table 5, indicated varying degrees of correspondence between individual VOICE subscales and those obtained from other inventories. Correlates above .60 were found for the Office Administration, Electronics, Mechanics, and Mathematics subscales. The Office Administration subscale, for example, correlated .61 with the NVII Office Scale and .61 with the ACI Administrative Scale while the Electronics subscale correlated .68 with the NVII Electronics measure and .69 with the corresponding scale in the ACI. Somewhat lower, but still indicative of significant overlapping variance, were scores on the VOICE Electronics subscale and the NVII Sonar Technician, Electronics Technician, Radio Man, Boiler Man, Electrician's Mate, and Aviation Electrician. The Heavy Construction subscale correlated in the low and mid-fifties with scales on both the NVII and the ACI. The Medical Service subscale correlated .50 with the NVII Hospital Corpsman and .58 with the NVII Health scale. The VOICE Mechanics subscale correlated in the .50 to .66 range with nine of the NVII-Lambda scores, .64 with the NVII Mechanical scale, and .69 with the ACI Mechanical scale. Although other relationships were found, they were, in most cases, not large enough to verify direct one-to-one correspondence between the scales.

Table 5. Correlations Between Scales on the VOICE, NVII and ACI Based on a Sample of Air Force Recruits (N = 1,390)

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36     19     45     09     01     31     -01     39       38     17     32     01     02     69     11     24       44     55     26     23     29     34     13     17	18     45     08     58     27     -23     11     10     16       10     -06     -23     07     12     -45     -01     -14     -03       19     04     03     -23     -14     39     -15     -03     08       19     -10     -04     02     01     -15     44     -01     -03       25     -31     06     -17     -14     09     07     01     -23       35     26     01     27     40     -41     08     03     23       30     -04     -15     09     09     -36     -04     00     03       40     -12     21     -19     -36     44     -16     09     -24       36     19     45     09     01     31     -01     39     09       58     17     32     01     02     69     11     24     18       24     55     26     23     29     34     13     17     35	18     45     08     58     27     -23     11     10     16     16       10     -06     -23 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    45     09     01	18     45     08     58     27     -23     11     10     16     16     17     25     -07     64     07       10     -06     -23     07     12     -45     -01     -14     -03     24     -28     23     -30     -01     -10       19     04     03     -23     -14     39     -15     -03     08     -01     -05     -22     18     04     07       19     -10     -04     02     01     -15     44     -01     -03     -15     09     -05     -09     -01     -13       25     -31     06     -17     -14     09     07     01     -23     -21     14     -10     08     -04     -04       35     26     01     27     40     -41     08     03     23     18     00     37     -21     02     14       30     -04     -15     09     09     -36     -04     00     03     14     -22     20     -19     -01     -06       40     -12     21     -19     -36     44     -16     09     -24     -12     14     -26 <t< td=""></t<>

The results of the multiple correlation analysis, shown in Tables A2 through A4 and summarized in Table 6, indicate to what extent scores in a given instrument, when combined in composite form, can be used to replicate scales in other inventories. As can be noted in Table 6, the VOICE subscales generally replicated scores in the NVII and ACI more completely than could these inventories replicate the VOICE scales. In the VOICE versus NVII comparisons, the multiple R's obtained using the VOICE subscales to predict each NVII-Lambda scale, in turn, ranged from .70 to .87. These values are quite high, indicating, in some cases, almost complete replication of the

scales. When the NVII-Lambda scales were used as predictors, only 3 of the 18 VOICE subscales could be estimated with equivalent accuracy. Similar findings were noted in the second and third sets of comparisons. Multiple correlations ranged from .60 to .84 when the VOICE was used to predict the NVII-Area scores and from .62 to .83 when the VOICE was used to predict the four ACI scales. Neither the NVII nor the ACI were able to estimate individual VOICE subscales with the same degree of accuracy.

Split-sample cross-validation of these results, also shown in Tables A2 through A4, indicated the

Table 6. Summary 6f Multiple Correlation Analyses – VOICE vs. NVII vs. ACI

		Frequen	cy Distribution	of Multiple Cor	relations	
		CE vs. Lambda		E vs.		E vs.
Multiple Correlation Range	VOICES VS. NVII-Lb	NVII-Lª	VOICES VS. NVII-Ab	NVII-Aª VS. VOICED	VOICES Vs. ACID	ACIª
80-89	8		3		2	
70-79	7	3	1	1		3
60-69		4	5	2	2	2
50-59		4		3		5
40-49		6		4		3
30-39				6		3
20-29		1		1		1
10-19				1		1

<sup>&</sup>lt;sup>a</sup>Predictor variables.

sample of 1,390 cases was quite stable for purposes of making these generalizations. The amount of shrinkage associated with each multiple correlation was generally found to be negligible, using only a random half-sample on which to construct a composite.

### VI. VOICE PROFILES

When vocational interest data are used for comparative purposes, it is often more meaningful to convert raw scores obtained on the subscales to a standardized metric system. Interpretation of interest profiles for an individual or group can be enhanced if the mean and standard deviation of scores obtained on each subscale are fixed at some constant value. Tables A5 and A6 show one such transformation in the form of T-scores where the average value of each subscale for a given reference group is set at 50 and the standard deviation of scores around that average is set at a value of 10. These conversions are based on the normative data for male and female Air Force recruits shown previously in Table 3. A profile of the transformed scores for a randomly selected male recruit is shown in Figure 1. The subscales are listed in the left margin. Across the top of this illustration, the T-score values ranged from 20 to 80 with the larger number indicating a higher affinity for the keyed activities. Both raw scores and T-score equivalents are shown for each subscale. This respondent displays marked preferences for the Science and Aesthetics subscales. Somewhat lower, but still above average, were scores obtained on the Outdoors, Audiographics, Agriculture, and Teacher/Counseling subscales. Below average scores were noted on Mechanics, Automated Data Processing, Office Administration, and Marksman. Based on the profile, this recruit would probably be more satisfied in an occupation involving natural or social science work than he would be for other occupational choices.

# VII. SUMMARY AND CONCLUSIONS

The domain of vocational interests as measured by the VOICE can be characterized by a limited set of dimensions that, in form and substance, are virtually identical for male and female respondents. In the present study, 18 common interest dimensions were identified using factor analytic techniques. The amount of original item variance accounted for by the factors ranged from 48% in the male sample to 46% in the female sample. A simple unit-weighted scoring technique for these dimensions replicated the original factor space almost entirely. Internal consistency value of items within the homogeneous subscales ranged from .79 to .96 for male respondents and from .72 to .96 for female respondents. Normative data based on 10,035 males and 12,710 females indicated that while the subscales may have identical meaning for both sexes, the degree of preference associated with each subscale was not always similar for both

bCriterion Variables.

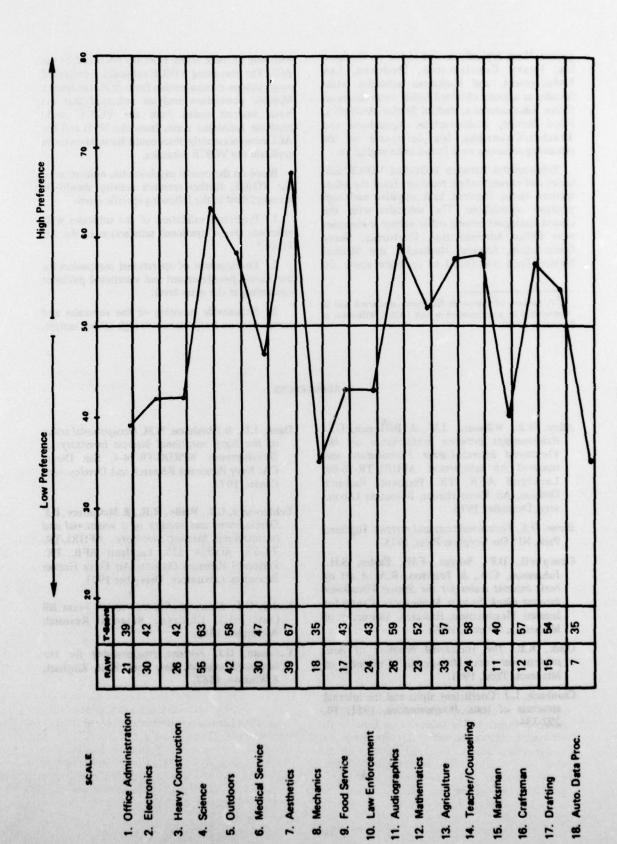


Figure 1. VOICE interest profile.

groups. Males typically scored higher on Electronics, Heavy Construction, Mechanics, Law Enforcement, and Marksman subscales while females as a group obtained higher mean scores on Office Administration, Medical Service, Aesthetics, Food Service, Audiographics, Agriculture and Teacher/Counseling. Sex differences on the remaining subscales were found to be negligible.

Relationships between individual VOICE subscales and corresponding measures from the other services varied between high negative and high positive correlations. The subscales with the closest analogues among other service inventories were Office Administration, Electronics, Heavy Construction, Science, Mechanics, and Medical Service. Each was found to correlate above .50

with one or more scales from the NVII and/or the ACI. The remaining VOICE subscales represented more unique measurements from that standpoint. Multiple correlation analyses indicated that the basic interest scales from the VOICE could replicate individual scales from the NVII and the ACI more accurately than could these inventories replicate the VOICE subscales.

Based on the overall psychometric evaluation of the VOICE, further research activity should be accomplished in the following specific areas:

- Predictive validation of the subscales with reference to occupational satisfaction in the Air Force.<sup>1</sup>
- 2. Development of operational composites for use during job-placement and vocational guidance counseling at the entry-level.
- 3. Nationwide norming of the subscales and composites on a representative high school sample.

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<sup>&</sup>lt;sup>1</sup> A portion of this work has been completed and is documented in a companion report (Alley, Wilbourn, & Berberich, 1976).

APPENDIX A. SUPPORTING TECHNICAL MATERIAL

Table A1. VOICE Item Characteristics for Male and Female Air Force Recruits

			Male	-	•	Female					Male		ī	Female	
į	Item	×	SD	R	×	So	7 m	. Š	Item	×	S	R.	×	S	4
	Office Administration								Electronics						
52.	Office worker	1.74	.78	19	1.98		_	25.	Electrician	2.31	78	89	1.75	80	69
*	Make out invoices	1.54	.70	69	1.79	.80	74		Radio mechanic	2.02	82	69	1.60	76	73
137.	Check a list of supplies received	1.76	.75	.64	1.92			•	Technician (electronics)	2.25	.83	.70	181	.85	69
	against those ordered							136.	Repair a television set	2.10	2	11.	1.72	.82	77.
150.	Balance a checkbook	1.79	76	.62	2.10		_	145.	Rewire the electrical system in a car	2.12	8	19	1.65	.82	80
173.	Make out work schedules	1.68	.73	.65	1.91		.58 1	159.	Repair small electrical motors	2.04	83	.73	991	18	82
185.	Keep personnel records on employees	1.67	.76	74	2.02		_		Find a problem in an electric	2.09	.85	.79	17.1	84	80
187.	Prepare income tax returns for	1.51	.72	.65	1.58	.78		20.0	circuit and fix it						
	other people						-	195.	Repair household electrical appliances	2.00	8	11.	1.68	.81	79
188.	Make out checks for payment of	1.65	.76	17:	1.94	.83	2 27.	207.	Install electrical outlets in a building	1.93	.82	.73	1.47	.72	.79
	business bills							239. 1	Design a circuit board	1.87	.85	99.	1.55	.76	.65
196	Supervise an inventory of textile goods	1.58	.73		1.59		.55 2	259.	Install a telephone	2.03	.82	.65	1.74	.82	69
201.	Prepare a monthly financial statement	1.54	.75	.73	1.70	.82	AT AT	260.	Inspect television receivers during	1.90	8.	74	1.50	.73	.73
	for a company								assembly for incorrect wiring						
206.	Take inventory for a department store	1.54	.72	.70	1.75		.66 2	276.	Find and replace defective transistors	1.99	.85	62.	1.59	.78	.82
231.	Make mimeograph copies of a letter	1.56	7.	.62	1.97	.82	22.00		Plan an electrical system for a house	2.01	8	.75	1.54	11.	.76
241.	File cards alphabetically	1.53	.73	69	2,05		_		Test television tubes	1.88	.82	.72	1.58	.75	.73
247.	Keep detailed records of expenses	1.51	2	.72	69.1	.80	.68		Build an antenna for a ham radio set	2.00	\$	89.	1.51	74	.73
	for a clothing store						-		Tinker with old radios	2.07	\$	69.	1.65	.81	.73
248.	Use an adding machine to check	1.78	.8	.63	2.14	98.	.66		Read about electronics	1.97	.83	89.	1.54	74	99.
	hand calculations								Build a radio	2.13	\$	74	99.1	8.	.76
263.		1.55	.73	.72	1.90			400	Wiring diagrams	2.02	98.	19.	1.61	.79	99.
769.		1.59	.72	89.	2.15		.65								
373	Help prepare the payroll for a business Rookkeeming	1.61	7.0	45	1.85	8. 8	.73								
380	Efficient methods for filing and	20.1	:		200		3								
	retrieving office records	1.54	.73	.71	1.87	.85	.75								
	Heavy Construction								Science						
17.	Construction worker	2.05	8	62	1 54	74		70	Ccientist	1 97	84	73	1 80	87	11
4.		1.76	.82	.57	1.40	69	54		Write a scientific report	1.66	36	.65	1.69	.82	. 89
47.	Mason	1.75	11.	.52	1.41	.64	_	_	Mix chemical compounds	1.88	8.	.70	1.90	98.	.73
59.	Plumber	1.72	37.	.52	1.32	.59	-		Use chemical laboratory apparatus	-	.84	.75	1.91	.87	11.
: 2	Toolmaker Toolmaker	1.00	97	50.	17.1	44.	1 0 0 0	770	Record observations from scientific instruments		.83	99.	2.01	.84	.67
89	Welder	1.91	83	59	136		_		Work in a scientific laboratory  Perform experiments using laser beams	213	0. 8	2,3	10.7	80.	28.
101	Dig a ditch	1.29	.56	.52	1.24		_		Determine concentrations of ethyl alcohol	1.70	36	3	1.71	.83	200
110	Clear stumps and brush with a buildozer	2.01	8. 0	.64	1.48	74		199.	Help a scientist perform an experiment	2.00	8.	.75	2.08	88.	.78
132	Do heavy physical labor	1.78	.6	54	1.35		7 05	-	Devise special scientific equipment	1.87	.85	.72	1.75	.85	.70
	TO THE THINK THE OF	2		?	10.		100		ior an experiment						

Table A1 (Continued)

Heavy Construction (Continued)				M.F		ĭ	Female					Mass		•	Fem ale	•
Heavy Construction   Continued   Heavy Construction   Continued   Heavy Construction   Continued   Heavy Construction   Continued   Heavy Construction   Life   16   13   64	ż	Special design of them	IX	So	2	×	the state of		No.	Item	×	SD	R	×	SD	RF
Help boad catons onto trucks   1,6   13   6,0   135   61   15   15   15   15   15   15   1		Heavy Construction (Con	tinued)						-	Science (Continued)						
Thread pipe by machine   170 75 59 133 59 372   Other microscope to classify bacteria   18	133	Heln load cartons onto trucks	191	71	09	1.35	19	No. 17	61	Determine the age of a fossil	1.89	.84	09	2.04	.87	
Description   Legar machinery in a factory   16.5   7.6   10.10   46.   6.1   11.4	143	Thread nine by machine	1.70	76	89	1.33	59	1965	127	Use a microscope to classify bacteria	1.81	.84	69	2.01	88	
Four concate for highway construction   169 77 69 1440 66 61 313 Read articles about science   1.90 88	46	Install heavy machinery in a factory	1.65	76	09	1.20	.48	100	43	Classify rocks by their physical properties	1.74	.80	.59	1.89		
Fig. 10 to blob is in a stricert   143 65 56 130 57 56 370. Chemistry   149 68 56 41 1370. Chemistry   149 68 56 41 1370. Chemistry   150 84 140 140 140 140 140 140 140 140 140 14	177	Pour concrete for highway construction	1.69	11:	69	1.40	99.		113.	Read articles about science	1.90	.83	.64	1.83		
Comparison of passer to power shore  1.83 8.6 4 1.51 77.5 8.7 8.4 388. Meteorology   1.90 8.8	212.	Fill potholes in a street	1.43	.65	56	1.30	.57	200	172.	Astronomy	5.09	.85	.57	2.29		
High put a new roof on an old house   1.83 80 5.6 1.63 78 A4 188. Microscopes   1.90 84	224.	Operate a bulldozer or power shovel	2.05	.85	.64	1.51	11.	777	375.	Chemistry	1.88	.85	99.	1.92		
Apply costs of plaster to walls         1.50         70         .52         1.40         .66         .41         .66         .16         .70         .52         .140         .66         .16         .70         .52         .140         .66         .16         .70         .51         .83         <	230.	Help put a new roof on an old house	1.83	.80	.56	1.63	.78	_	186.	Meteorology	1.90	ğ	.56	1.94		
Series decilings	289.	Apply coats of plaster to walls	1.50	.70	.52	1.40	99.	-	.888	Microscopes	1.92	.84	4	2.02		
Vorte outdoors		and ceilings						.,	391.	Nuclear reactors	2.01	.85	.56	1.67	.81	.52
Work outdoors         Outdoors         2.48         70         31         2.56         67         35         20. Dental hygienist         Medical Service         1.27         72         73         73         73         74         73         74         73         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         74         73         74         73         74         74         73         74         74         73         74         74         73	296.	Rivet sheet metal	1.66		.62	1.28	.57	_	195.	Radiation belts in space	1.93	.85	.63	1.73		
Work outdoors         2.48         7.0         31         2.56         67         35         20. Dental bygienist         1.57         78           Go for a 20-mile hike         Co canoeing         2.04         82         38         2.24         82         37         78         Physical therapist         1.73         78           Go dear hunting         2.04         7.4         8.0         6.0         9.5         8.2         1.3         1.6         8.0         1.7         78         1.7         1.8         1.7         1.8         1.7         1.8         1.7         1.8         1.6         8.0         1.2         1.6         8.0         1.6         8.0         1.2         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         8.0         1.6         1.7         1.6         8.0         1.6         1.7         1.6         1.6         1.6 <t< td=""><td></td><td>Outdoors</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Medical Service</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		Outdoors								Medical Service						
Go for a 20-mile hike         2.04         82         2.34         82         37         87         Physical therapist         1.71         78           Go cancing         Co cancing         2.04         82         38         2.24         82         37         Physical therapist         1.71         78           Go trap shocing         2.29         7.0         54         2.63         6.8         53         113         Give lists aid to accident victims         1.74         83           Go trap shocing         2.29         7.0         54         2.63         6.8         31         13         Give lists aid to accident victims         1.74         83           Spend a week at the seashore         2.29         7.5         4.5         1.67         2.84         4.5         1.6         2.84         4.5         1.6         2.84         4.5         1.6         2.84         4.6         1.7         8.6         8.8         1.7         8.6         8.8         2.10         Work in a bropital or poperation         1.7         8.0         8.8         1.7         8.6         8.2         1.7         8.0         1.7         8.0         1.7         8.0         1.7         8.0         1.8         1.7	180		248	70	31	2 56	19	35	20	Dental hygienist	1.52	.72	.55	1.85		
Go canceing         2.49         74         60         260         69         58         62         Practical nurse         1.27         56           Go deer hunting         Ride a trail bite through the woods         2.29         73         16         86         29         99         168         86         29         168         86         29         168         86         29         168         86         29         168         86         29         168         86         29         168         86         29         168         86         29         178         80         20         80         178         80         174         142         Assist a surgeon during an operation         1.74         83         174         142         Assist a surgeon during an operation         1.74         83         174         142         Assist a surgeon during an operation         1.74         83         1.74         83         1.24         142         Assist a surgeon during an operation         1.74         83         1.74         80         1.74         80         1.75         80         1.75         80         1.75         80         1.75         80         1.75         80         1.75         1.75         1.75 </td <td>312</td> <td>Go for a 20-mile hike</td> <td>2.04</td> <td>.82</td> <td>38</td> <td>2.24</td> <td>.82</td> <td>37</td> <td>57.</td> <td>Physical therapist</td> <td>1.71</td> <td>.78</td> <td>.53</td> <td>2.23</td> <td>.82</td> <td></td>	312	Go for a 20-mile hike	2.04	.82	38	2.24	.82	37	57.	Physical therapist	1.71	.78	.53	2.23	.82	
Go deer hunting         2.38         8.2         39         1.68         8.6         2.2         99. Take blood pressure readings         1.68         7.6           Ride a trail bike through the woods         2.39         7.0         54         2.6         3.6         3.11         3.11         3.6         4.14         1.2         3.6         6.8         3.11         3.11         3.6         8.6         3.1         3.1         3.6         8.6         3.1         3.1         3.6         8.6         3.1         3.6         3.1	319	Go canoeine	2.49	74	09	2.60	69	58	62.	Practical nurse	1.27	.56	44	1.95		
Ride a trail bike through the woods         2.59         70         54         2.63         .68         113. Give first aid to accident victims         2.06         80           Go tap shooting         2.29         76         2.81         167         2.86         4.4         161         10. Work in a hospital         2.06         80           Spend a week at the scashore         2.25         8.7         1.67         2.86         4.4         61         210. Work in a hospital         1.74         83           Go on a picinic         2.54         6.9         3.5         2.13         8.6         2.13         Work in a hospital         1.79         80           Learn survival techniques for living in         2.56         3.4         4.6         1.21         Work in a hospital         1.79         80           Learn survival techniques for living in         2.56         3.4         2.8         2.3         7.0         9.6         1.79         80           Learn survival techniques for living in         2.50         3.4         2.4         86         2.74         3.8         3.24         3.8         3.24         3.8         3.24         3.8         3.24         3.8         3.24         3.8         3.24         3.8         3.	326.	Go deer hunting	2.38	.82	39	1.68	98.	22	66	Take blood pressure readings	1.68	37.	.57	2.20		
Go trap shooting         2.25         34         45         1.65         84         14         Assist a surgeon during an operation         1.74         83           Exercise for physical fitness         2.29         75         4.2         2.51         69         35         154         7ake X-rays of broken bones         1.79         80           Spend a week at the seashore         2.29         7.5         2.86         4.8         15.1         60         8.6         12.1         60         8.0         1.79         80           Go asaling         Learn survival techniques for living in         2.50         7.4         61         2.55         7.1         48         238         Test other people's vision using an eye chart         1.66         7.5           Be a skydiver         2.50         7.4         61         2.55         7.1         48         238         Test other people's vision using an eye chart         1.66         7.7           Go fishing         1.24         Perform physical diets for sick people         1.48         3.49         44         Perform man and and and and and and and and and a	333.	through the w	2.59	.70	54	2.63	89	-	13.	Give first aid to accident victims	2.06	.80	4	2.19		
Exercise for physical fitness         2.29         7.5         4.2         2.51         6.9         3.5         15.4         Take X-rays of broken bones         1.95         82           Spend a week at the seashore         2.54         6.9         2.86         1.67         7.86         1.95         82           Co saling         Learn survival techniques for living in         2.51         7.3         6.5         2.37         Work out special diets for six people         1.46         6.8           Learn survival techniques for living in         2.50         7.4         6.1         2.55         7.1         4.8         2.38         1.44         2.8         2.74         8.8         3.6         2.74         7.8         3.8         2.74         4.8         2.38         1.44         2.8         3.6         3.9         2.44         7.7         3.8         3.4         2.44         8.8         3.6         3.44         Perform physical therapy many exports at your sack propel for immunizations         1.57         7.7<	345		2.25	8.	45	1.65	8.	-	42.	Assist a surgeon during an operation	1.74	.83	99.	1.97		
Spend a week at the seashore         2.58         71         67         2.86         4.4         61         210. Work in a hospital         1.79         80           Go on a picnic         Go saling         2.51         7.3         88         2.74         5.8         2.39         3.8         56         213. Gree antirables shots to dogs         1.69         80           Learn sating         Co saling         2.0         74         51         2.8         2.74         3.8         5.23         3.9         3.6         2.94         7.8         6.6         5.0         7.8         6.6         2.8         1.6         7.8         7.9         7.9         7.8         7.9         7.9         7.9         7.8         7.9         7.9         7.8         7.9         7.9         7.8         7.9         7.9         7.8         7.9         7.9 <td>349.</td> <td>Exercise for physical fitness</td> <td>2.29</td> <td>.75</td> <td>42</td> <td>2.51</td> <td>69.</td> <td>_</td> <td>54.</td> <td>Take X-rays of broken bones</td> <td>1.95</td> <td>.82</td> <td>.58</td> <td>2.27</td> <td></td> <td></td>	349.	Exercise for physical fitness	2.29	.75	42	2.51	69.	_	54.	Take X-rays of broken bones	1.95	.82	.58	2.27		
Go on a picnic         2.54 .69 .65 2.89 .38 .56         2.6 13. Give antirabies shots to dogs         1.66 .78           Go sailing         Learn survival techniques for living in the wildcareas.         2.51 .73 .68 2.74 .58 .65 2.77 .48         2.6 2.77 .Work out special diets for sick people and the wildcareas.         1.66 .75 .77 .79           Be a skydiver of confining         2.50 .74 .61 2.55 .71 .48         2.38 .41 2.24 .86 .36         2.49 .73 .50 .2.31 .81 .39 .256. Give injections to people for immunizations and the wildcareas.         1.61 .77 .77 .77 .77 .77 .77 .77 .77 .77 .7	352.	Spend a week at the seashore	2.58	17.	19.	2.86	44.		210.	Work in a hospital	1.79	.80	49.	2.20		
Co sailing         2.51         73         68         2.74         58         65         237         Work out special diets for sick people         1.46         68           the widerness         2.50         74         61         2.55         71         48         238         Test other people's vision using an eye chart         1.66         77         78           Be a skydiver         2.23         85         41         2.24         86         36         249         73         50         2.31         81         39         256. Give injections to people for immunizations         1.61         77           Play softball         2.49         73         50         2.31         81         39         256. Give injections to people for immunizations         1.50         77         77           Play softball         2.44         74         36         265. Supervise activities for mentrally ill patients         1.50         77         77           Co camping         2.46         74         30         265. Supervise activities for mentrally ill patients         1.50         77         77           Co camping         2.48         3.48         3.48         4.48         74         36         365. Supervise activities for mentrally ill patients	353.	Go on a picnic	2.54	69.	.65	5.89	.38	-	213.	Give antirabies shots to dogs	1.66	.80	4.	1.90		
Learn survival techniques for living in 2.50 .74 .61 2.55 .71 .48 238. Test other people s vision using an eye charf the widerness the widerness of static and the widerne	355.	Go sailing	2.51	.73	89.	2.74	.58		237.	Work out special diets for sick people	1.46	89.	4.	1.81		
the wilderness  Be a skydiver  Be a skydiver  Co fathing  Co fathing  Co fathing  Co fathing  Co fathing  Co camping  Co campi	356.	Learn survival techniques for living in	2.50	74	19.	2.55	.71	_	238.	Test other people's vision using an eye chart	1.66	.75	4.	2.07		
Sec a Broadway play   Compiled Cause	-	the wilderness	, ,,			234	78	_	244	Perform physical therapy	1.67	2,5	55	7.17		
Cocamping   2.47   74   36   268   Supervise activities for mentally ill patients   1.52   73   74   36   268   Help give physical examinations   1.51   72   73   74   48   48   48   2.48   74   36   2.48   49   48   48   2.48   74   39   49   49   49   40   40   40   40   4	360.	Be a skydiver	2.40		. 5	231	00.	_	. 643	Take blood samples from numans	10.1	::	6.	1.70		
Cocamping   2.65 .65 .67 .73 .59 .60 .268. Help give physical examinations   1.57 .72     274. Assist a dentist by cleaning teeth   2.78 . Fill prescriptions for a doctor   1.51 .72     278. Fill prescriptions for a doctor   1.51 .72     278. Fill prescriptions for a doctor   1.70 .79     378. Disease prevention   1.70 .79     378. Disease prevention   1.70 .79     379. Performance of emergency medical operations   1.86 .84     Brows through a library   1.60 .77 .51 2.26 .82 .43     Brows through a library   1.60 .77 .51 2.26 .82 .73     See a Broadway play   1.86 .78 .74 .50 .68     See a Broadway play   1.80 .82 .48 .74 .50 .48 .74 .50     Participate in a debate   1.82 .82 .38   1.92 .84 .31   155. Adjust the brakes on an automobile   2.12 .83     Cocamping   1.50 .77 .79     Cocamping   1.70 .79     Coca	362.	Go rishing	246		200	2 48	74	_	.007	Give injections to people for immunizations	1.53	17.	47	1.00		
1.00	300	risy southern	266	44	2	273	80	_	.603	Under wive advertised examinations	1 67			300		
278	307.	Co camping	20.4	3	3	-		-	.007	Acres a dentier by denting teath	1.0		200	1 70		
276. Trip prescriptions of an experiment of emergency medical operations   1.77. 79     278. Trip prescriptions of emergency medical operations   1.77. 79     279. Mechanics   1.60. 77. 51 2.26. 82. 43     2.26. 82. 43   49. Mechanic (automobile)   2.25. 81     2.26. 81. 41. 2.35. 718 3.39   94. Replace valves in an engine   2.07. 84     2.26. 81. 41. 2.35. 718 3.39   96. Install a radio in a car   2.07. 84     2.26. 83. 74. 50   148. Overhand a tractor engine   1.80. 81     2.26. 83. 74. 50   148. Overhand a tractor engine   1.93. 86     2.27. 84. 31   155. Adjust the brakes on an automobile   2.12. 83     2.29. 84. 31   155. Adjust the brakes on an automobile   2.12. 83     2.20. 84. 34. 2.48. 34   34. 34. 34. 34. 34. 34. 34. 34. 34. 34.									100	Eil associations for a doctor	1 70		3.5	2 10		
276. Disease provention   276. Disease provention   277. Secondary play   276. Disease provention   276. Disease provention   2.66. Secondary play   2.66. Secondary play   2.66. Secondary   2.66. Secondary play   2.66. Secondary play   2.66. Secondary   2.66. Secondary play   2.66. Secondary pla									.00	rill prescriptions for a doctor	22		200	2 20		
Read poetry         Mechanics         Mechanics         Acethetics         Acetheti									9/8.	Disease prevention	1 86		9.5	2.700	28	
Read poetry         Mechanics         Mechanics         2.25 .81           Work for a political cause browse through a library         1.60 .77 .51 2.26 .82 .43         49. Mechanic (automobile)         2.25 .81           Browse through a library         1.60 .75 .35 1.68 .79 .31         96. Install a radio in a car 2.04 .83 .42 2.60 .68 .37 135. Perform routine maintenance on farm tractors 1.80 .81         2.21 .79 .39           See a Broadway play         1.88 .83 .48 2.48 .74 .50 [148. Overhaul a tractor engine 1.82 .82 .38 1.92 .84 .31 [155. Adjust the brakes on an automobile 2.12 .83 .								-		religinative of emergency invarian operations	00.1			6.4		
Read poetry         1.60         .77         .51         2.26         .82         .43         49. Mechanic (automobile)         2.25         .81           Work for a political cause         1.60         .75         .35         1.68         .79         .31         .68         .79         .31         .68         .79         .31         .69         Install a radio in a car         2.07         .84           Read a novel         2.04         .83         .42         .260         .68         .37         135         Perform routine maintenance on farm tractors         1.80         .81           See a Broadway play         1.88         .89         .48         .34         .35         Perform an automobile         1.93         .86           Participate in a debate         1.82         .82         .88         .18         .89		Aesthetics								Mechanics						
Work for a political cause         1.60         .75         .35         1.68         .79         .31         94. Replace valves in an engine         2.07         .84           Brows through a library         1.86         .81         .41         2.35         .78         .39         96. Install a radio in a car         2.21         .79           Read a novel         2.04         .83         .42         2.60         .68         .37         135. Perform routine maintenance on farm tractors         1.80         .81           See a Broadway play         1.88         .83         .48         2.48         .74         .50         148. Overhaul a tractor engine         1.93         .86           Participate in a debate         1.82         .82         .84         .31         155. Adjust the brakes on an automobile         2.12         .83	303.	Read poetry	1.60	11.	.51	2.26	.82	.43	49.	Mechanic (automobile)	2.25	.81	19.	1.81		
Browse through a library         1.86         .81         .41         2.35         .78         .39         96. Install a radio in a car         2.21         .79           Read a novel         2.04         .83         .42         2.60         .68         .37         135. Perform routine maintenance on farm tractors         1.80         .81           See a Broadway play         1.88         .83         .48         2.48         .74         .50         148. Overhaul a tractor engine         1.93         .86           Participate in a debate         1.82         .82         .84         .31         155. Adjust the brakes on an automobile         2.12         .83	306.	Work for a political cause	1.60	.75	.35	1.68	.79	.31	94	Replace valves in an engine	2.07	8.	.63	1.63		
Read a novel         2.04 .83 .42 2.60 .68 .37   135. Perform routine maintenance on farm tractors         1.80 .81           See a Broadway play         1.88 .83 48 2.48 .74 .50   148. Overhaul a tractor engine         1.93 .86           Participate in a debate         1.82 .82 .38 1.92 .84 .31   155. Adjust the brakes on an automobile         2.12 .83 .	307.	Browse through a library	1.86	18.	41	2.35	.78		96	Install a radio in a car	2.21	.79	.38	1.82	.83	.28
See a Broadway play  1.88 .83 48 2.48 .74 .50   148. Overhaul a tractor engine   1.93 .86  Participate in a debate   1.82 .82 .38   1.92 .84 .31   155. Adjust the brakes on an automobile   2.12 .83 .	310.	Read a novel	2.04	.83	.42	5.60	89.		35.	Perform routine maintenance on farm tractors	1.80	28.	40	1.44		1
Participate in a debate 1.82 .82 .88 1.92 .84 .31 [155. Adjust the brakes on an automobile 2.12 .83	315.	See a Broadway play	1.88	.83	8.	2.48	74		48	Overhaul a tractor engine	1.93	98.	.56	4.		
	316.	Participate in a debate	1.82	.82	.38	1.92	.84	_	55.	Adjust the brakes on an automobile	2.12	.83	9.	1.73		-

Table A1 (Continued)

		The second			-					OCCUPATION OF THE					
	State As Spinority a spiror flow	×	SD	Be	×	SD	R	No.	lten.	IX	SD	RF	IX	SD	R
	Aesthetics (Continued	(p							Mechanics (Continued)	0				23	
:	Discuss a nainting	1 69		100	000			5 606	Supervise work in a garage	1 82			1 45		29
130	Dand Chalemann's plays	1 60	76	200	2 03	8	57 75		Design a drageter	2 20	8	46	1 68	8	27
	near Suarcapeare s plays				63		-		Wite articles for automobile magazines	1 73			1 30		1
333.	Listen to an opera		0.00		1.0.1		90.		wille articles for automorpe magazines	1.1					1
339.	Watch educational television	1.83			5.03		-	-	I une-up a car	75.7			1.70		
342.	Tune a musical instrument	1.81			1.88				Watch drag racing	2.44			2.20		.22
346	Read short stories	2.09			2.64		.34   34	343. C	Change the oil in a car	2.20		99	1.82		.50
27	Co to a symphony concert	1.67			2.05		_		Rebuild a lawn-mower engine	2.09			1.47		24
	West of the symptoms where	. 43			200		-		Adingt a corpurator	233			1 73		40
	Water a Daviet	200	2:		5:				Today a caloure of	100		20.	1 76		,,
1	Classical music	1.73			41.7		00.	304.	now different types of engines work	47.7			1.1		.50
	Food Service								I aw Enforcement						
											1				
	Baker	1.43	99.	.62	1.77	. 26	129	4.	Ambulance driver	1.86	.82	.37	1.64		.37
13.	Chef	1.52		.65	1.73			_	Customs agent	1.91			2.10		.32
86.	Waiter	1.22		.42	1.39				Explosives detonator	1.84			1.37		.31
21	Mix nancake hotter	1 30		62	177		_		Fire fighter	2.00			1.66		48
33	Min painter of the	1 34	2	200	1 70		_		Gire inspector	1 86			1 63		40
		200		25	21.17		_		Historical man	210			101		07
	Decorate cakes	1.30		40.	7.10		22		righway patrounan	2.10			1.7		00.
13.	Carry out dirty dishes in a restaurant	1.16		.39	77.1		_		Policeman	7.08			2.03		9
234.	Manage a cafeteria	1.43	99.	.45	1.50	17.	.54		Prison guard	1.47	.72	.56	1.31	.62	.52
253.	Work as a short-order cook	1.34		.62	1.39				Private investigator	2.21			2.17		.52
264.	Run a food catering service	1.37			1.48	118	64 10	_	Investigate insurance claims	1.92		.43	1.90		4.
297.	Make ice cream	1.60			2.11				Arrest a traffic violator	1.98			1.89		.65
324.	Improve a recipe	1.51		.52	2.19		_		Be a witness at a criminal trial	1.77		.46	1.74		.50
328.	Buy food for a cookout	1.77	.78	.39	2.35		_		Help rescue someone from a fire	2.31			2.19	.8	4.
376.	Chinese cooking	1.56		.45	2.11	98.	244	٠.	Stop a prison riot	1.65		.62	1.46		.54
381.	Food processing	1.46		.51	1.77		18	184. F	Fight a forest fire	2.17			1.92		.42
	Audiographics								Mathematics						
*	Photoengraver	1 68			1 86	11		91	Find information in numerical tables	1 64	76		1 83		44
24	Photographer	2.74			2 54		69		Construct mathematical tables	163	78	55	1 59	79	. 99
200	Television commence	200			316	000	-	Ä	Coltra crithmetic nroNeme	1 86			1 03		75
	Television cameraman	77.7			2.13		25.		Solve antimiette problems	1.00					3.5
12.	lake aerial photographs	7.35			64.7		_		WORK WITH DUMINGERS	1.67					77.
£ !	Draw maps from photographs	1.85			1.93			169.	Use a table of logarithms to solve	1.68	9.	.63	9.	78.	.69
57.	Operate a 16mm movie camera	7.71			2.47		_		a mathematics problem						-
158.	Kepair cameras	1.93	26.	.50	1.83	78.	.42 24	242. 0	Correct errors made by another person	1.65	./8	.50	1.8	8.	.58
	Record the sound track for a motion picture	41.7			17.7		_		n an antinmetic problem	. 30					
.977	Develop photographs	7.09			7.40				Devise shortcut methods for adding numbers	1./8		. 40			30.
	Join a photography club	1.69			2.38		_		Solve geometry problems	1.7					64
							3		Algebra	2.01	æ.		7.08	.89	9.
							3.1	Τ.	Calculus	1.68		.56	1.66		9.
							25	1 082	How to multiply numbers on a desk calculator	1.96			2.12		46
							5		The state of the s						

Table A1 (Continued)

	-	۱	1	-		1					1	1	I	-
B. Ren	ix	8	2	×	8	a.	Š	Item	×	g	R	ı×	SD	4
Agricultus								Teacher/Counseling						
9. Farmer	1.77			1.89	.84	57	80	Teacher	1.90	.83	36	2.12	.82	49
33. Forest ranger	2.39			2.23	8.	.56	170.	Give on-the-iob training	2.20	76	.35	2.31	.75	48
	1.55			1.97	.83	.56	183.	Teach someone to read	1.91	.82	38	2.39	17	54
85. Veterinarian	1.82			2.16	98.	49	211.	Teach someone how to solve a problem	2.04	8	43	2.30	79	56
	2.31			2.14	.87	_	215.	Organize and lead a study group	1.69	11	33	1 93	82	88
	2.02			2.34	.82	-	229.	Give a talk before a small group	1.77	78	39	1.97	82	57
	1.35			1.73	78		235	Help a high school student with his homework	1 89	78	38	2 24	77	55
	1.42	65	34	1.66	78		254	Listen to people's problems and try to help them	m 2.03	83	40	2 44	75	23
244							257	Solve problems by analyzing		88	3	2 25	82	4
172. Drive a tractor on a farm	1.86			1.79	.85	42	:	them logically		3		2.43		
	2.48			2.56	19	43	300	Organize recreational activities for	1 92	83	33	30 6	2	52
	2.11			2.20	2	_	;	a group of people				2		
	1.66			1.90	80	4								
	1.78	80	38	2.04	.85	43								
302. Plant and take care of a vegetable garden	1.73			2.29		.51								
396. How to raise tropical plants	1.76	98. 9	35	2.15	\$	.42								
Marksman								Craftsman						
35. Gunsmith	2.05			1.52	.73	.55	38.	Jeweler	1.63	74	.30	2.09	.80	30
	2.16	. 82	.48	1.87	.85	.46	63.	Printer	1.56	.7	.31	1.67	74	10
	2.04			1.56	.76	.46	73.	Shoe repairman	1.27	.53	39	1.22	.49	.24
	2.38	Burs		1.68	98	.53	75.	Steamfitter	1.34	.59	.30	1.15	.40	.16
	2.25			1.65	48.	.57	78.	Tailor	1.36	.62	35	1.55	74	.56
	2.28			09.	80	.70	87.	Watchmaker	1.50	.70	34	1.48	69.	.24
366. Belong to a gun club	2.23			1.66	.83	F.	98.	Sew clothes from patterns	1.22	.52	.78	5.06	.87	09.
Drafting								Automated Data Processing	guis					
S. Artist	1.83			2.16	85	46	15.	Computer operator	2.26	79	70	326	79	77
22. Draftsman	2.02			1.70	78	49	16.	Computer programmer	223	80	20	2 22	80	11
	2.01			1.81	84	2	36	Keypinch operator	1 71	200	45	200	84	23
	1.82			1.82	18	20	151.	Write a computer program	1 92	8	2	1 93	84	20
ba	1.84			1.93	85	49	174	Find the errors in a committee program	1 91	8	44	1 86	84	5
	2.00	88.	.55	1.94	.87	45	250.	Operate a machine that sorts	1.75	80	4	1 92	8	42
-						_		punched cards						
222. Draw a topographical map of the United States	1.73	9.79	.46	1.73	.82	94.	262.	Perform maintenance on a computer	1.99	.85	.41	1.65	.79	.39

Table A2. Multiple Correlation Analysis - VOICE vs. NVII-Lambda Scales

VOICE to F	redict NVII-L	ambda		NVII-Lamb	da to Predict	VOICE	
		Multiple R	No. 1			Multiple R	
Subscale	Full	HS1	cv	Subscale	Full	HS1	cv
Quartermaster	.73	.71	.75	Office Admin.	.65	.66	.63
Sonar Tech.	.84	.82	.84	Electronics	.75	.74	.74
Electronics Tech.	.84	.84	.84	Hvy Construction	.61	.63	.58
Radio Man	.79	.78	.78	Science	.71	.73	.69
Data Processing	.71	.70	.70	Outdoors	.48	.48	.47
Store Keeper	.72	.73	.69	Med. Svc.	.66	.69	.62
Commissary Man	.70	.70	.69	Aesthetics	.53	.55	.50
Engine Man	.87	.87	.86	Mechanics	.70	.70	.69
Boiler Man	.86	.87	.85	Food Service	.49	.51	.46
Electrician's Mate	.85	.85	.85	Law Enforce.	.40	.40	.39
Equip. Operator	.85	.85	.84	Audiographics	.45	.44	.45
Aviation Ord. Man	.84	.84	.84	Mathematics	.64	.65	.62
Air Control Man	.75	.72	.75	Agriculture	.47	.48	.46
Aviation Elect.	.85	.84	.85	Teach/Counsel	.50	.52	.47
Hospital Corpsman	.78	.80	.76	Marksman	.49	.49	.47
				Craftsman	.28	.30	.22
				Draftsman	.58	.59	.57
				Auto. Data Proc.	.57	.57	.56

Full - Full sample (N = 1,390) HS1 - Half sample 1 (N = 695) CV - Results from half sample 1 cross-validated to half sample 2.

Table A3. Multiple Correlation Analysis - VOICE vs. NVII-Area Scales

VOICE	Predict NVII	Area		NVII Area	to Predict \	OICE	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Multiple R		WEINGTON HIM	11 E 15 0 1	Multiple R	
Subscale	Full	HS1	cv	Subscale	Full	HS1	cv
Mechancial	.84	.85	.83	Office Admin.	.62	.62	.62
Health	.78	.81	.73	Electronics	.71	.71	.71
Office	.82	.82	.81	Hvy Construction	.56	.57	.53
Electrical	.81	.82	.81	Science	.57	.58	.55
Food Service	.66	.69	.63	Outdoors	.32	.33	.28
Carpentry	.60	.62	.58	Med. Svc.	.59	.63	.55
Sales Office	.67	.71	.62	Aesthetics	.48	.52	.42
Clean Hands	.61	.63	.57	Mechanics	.66	.67	.63
Outdoors	.69	.70	.66	Food Service	.45	.49	.41
				Law Enforce.	.22	.20	.20
				Audiographics	.39	.40	.36
				Mathematics	.39	.40	.37
				Agriculture	.37	.39	.36
				Teach/Counsel	.44	.47	.39
				Marksman	.37	.41	.35
				Craftsman	.17	.20	.10
1233255		2.2 2 2 3		Draftsman	.32	.33	.28
	35			Auto. Data Proc.	.49	.48	.50

Full - Full sample (N = 1,390) HS1 - Half sample 1 (N = 695) CV - Results from half sample 1 cross-validated to half sample 2.

Table A4. Multiple Correlation Analysis - VOICE vs. ACI Scales

VOIC	VOICE to Predict ACI			ACI to	ACI to Predict VOICE	CE	
		Multiple R				Multiple R	
Subscale	Full	HS1	٥	Subscale	Full	HS1	5
Combat	.62	.62	09.	Office Admin.	.63	49.	.62
Mechanical	.81	.82	.78	Electronics	.75	27.	.75
Electronics	.83	8.	.83	Hyy Construction	.62	.6	09.
Administrative	69:	.72	99.	Science	.59	.58	.59
				Outdoors	.51	.52	.50
				Med. Svc.	.26	.26	.26
				Aesthetics	.42	4	39
				Mechanics	.79	.81	11.
				Food Service	.17	.14	.17
				Law Enforce.	.42	.41	.42
				Audiographics	39	36	.41
				Mathematics	.73	.73	17.
				Agriculture	39	37	.37
				Teach/Counsel	.53	.53	.53
				Marksman	.56	.58	.52
				Craftsman	32	30	.32
				Draftsman	.45	.45	.45
				Auto. Data Proc.	.56	.57	.55

Full - Full sample (N = 1,390) HS1 - Half sample 1 (N = 695) CV - Results from half sample 1 cross-validated to half sample 2.

Table A5. T-Score Conversion Tables for Male Air Force Recruits

tration	-	tronics	3		3		Outdoors		Service		Aest	Aestheties	Mash	Mechanics	•	Service
-	Rose	-	Reg	-	2	-	Rew	-	Row	-	Raw	-	Rew	-	Raw	-
38	20	*	20	37	20	36	15	61	20	37	15	36	15	31	15	4
1 35	1 21	35	21	38	21	37	91	20	21	38	91	37	16	33	91	41
4	22	35	22	39	22	37	11	22	22	39	17	38	17	¥	17	43
7	23	36	23	4	23	38	18	23	23	9	18	9	18	35	18	45
42	24	37	24	40	24	39	19	25	24	41	19	41	16	36	19	4
5 43	23	38	25	4	25	40	20	56	25	42	20	42	20	37	20	48
1	97	38	56	42	56	+	21	28	56	43	21	43	21	38	21	49
45	77	39	27	43	27	41	22	56	27	4	22	45	22	39	22	51
4	28	4	28	4	28	42	23	30	28	45	23	4	23	4	23	53
47	67	41	53	45	29	43	24	32	56	94	24	47	24	41	24	¥
48	30	42	30	46	30	4	25	33	30	47	25	64	25	43	25	28
49	31	42	31	47	31	4	26	35	31	48	56	8	56	4	26	57
		43	32	48	32	45	27	36	32	49	27	51	27	45	27	59
		4	33	49	33	46	28	38	33	20	28	52	28	4	28	19
		45	34	20	34	47	53	39	34	51	53	8	62	47	53	62
		46	35	51	35	48	30	4	35	52	30	55	30	84	30	8
36 53		4	36	52	36	84	31	42	36	52	31	8	31	49	31	65
		47	37	53	37	49	32	43	37	53	32	28	32	8	32	19
		48	38	¥	38	20	33	45	38	×	33	29	33	51	33	89
		64	39	55	39	51	34	4	39	55	34	8	*	53	34	2
		49	4	99	40	52	35	48	40	26	35	62	35	¥	35	72
	P	20	4	27	41	52	36	64	4	27	36	63	36	55	36	73
		21	42	28	42	53	37	51	42	28	37	2	37	8	37	75
	-	25	43	89	43	7	38	25	43	29	38	65	38	22	38	76
		23	4	3	4	55	39	¥	4	3	39	19	39	28	39	78
		23	45	19	45	99	4	55	45	19	4	89	9	86	4	80
63		*	4	62	4	26	+	27	\$	62	41	69	41	8	41	81
2		55	47	63	47	27	42	28	47	63	42	17	42	62	42	83
-		*	48	2	48	28	43	65	48	2	43	22	43	63	43	\$
		8	49	65	49	29	1	19	49	65	4	2	4	Z	4	8
		57	20	8	20	29	45	62	20	8	45	74	45	65	45	87
		88	51	19	51	99			51	67						
52 68		29	25	89	25	19			25	89						
		3	23	69	23	62			53	69						
		8	¥	2	¥	63			Z,	2						
		19	25	7	25	63			55	2						
		62	8	72	*	Z			×	7						
		63	27	73	27	65			27	22						
		Z	28	74	28	99			28	2						
		2	29	25	29	19			29	4						
				*												

15   10   31   12   37   15   32   10   34   7   30   7   40   7   35   7   35   15   35   3	3/1	4	÷ 2	1	Agthomotion	Agrica	ultura	Coun	Teacher/ Counselling	Man	1	Craf	1	6	-	2 E	Automato Data Processing
31         10         31         12         37         15         32         10         34         7         40         7         35         7           32         11         33         13         13         13         13         14         38         16         37         19         40         7         35         7           35         14         38         16         40         17         44         40         17         34         7         40         7         35         7           36         14         38         16         40         17         44         40         17         44         40         41         44         41         41         44         41         44         41         44         41         44         44         41         44         41         44         41         44         41         44	-	Raw	-	Res	-	Rev	-	Res	-	Raw	-	3	-		-	Reg	-
32       11       33       16       33       11       35       8       33       8       44       8       37       9       35       9       40       9       37       9       37       9       37       9       37       9       37       9       37       8       33       8       44       8       37       9       37 <td< td=""><td>5 31</td><td>2</td><td>31</td><td>12</td><td>37</td><td>15</td><td>32</td><td>10</td><td>34</td><td>7</td><td>30</td><td>1</td><td>\$</td><td>7</td><td>35</td><td>7</td><td>35</td></td<>	5 31	2	31	12	37	15	32	10	34	7	30	1	\$	7	35	7	35
33       12       35       14       40       17       35       12       37       9       47       9       40         34       15       40       17       35       12       37       9       47       9       40       9         37       15       40       17       44       18       36       13       11       47       11       47       9       40       9       40       9       40       9       40       9       40       9       40       9       40       9       40       9       40       9       40       11       44       11       41       11       40       11       41	6 32	=	33	13	38	16	33	=	35	00	33	∞	4	•	37	00	37
35       13       37       15       41       18       36       13       39       10       37       10       50       10       42       10         37       15       40       17       44       18       45       20       39       15       41       11       40       11       54       11       44 <t< td=""><td>7 33</td><td>12</td><td>35</td><td>14</td><td>4</td><td>17</td><td>35</td><td>12</td><td>37</td><td>6</td><td>35</td><td>6</td><td>47</td><td>6</td><td>4</td><td>6</td><td>39</td></t<>	7 33	12	35	14	4	17	35	12	37	6	35	6	47	6	4	6	39
36       14       38       16       43       19       37       14       41       11       40       11       54       11       44       20       39       15       44       11       44       44       11       44 <td< td=""><td>8 35</td><td>13</td><td>37</td><td>15</td><td>41</td><td>18</td><td>36</td><td>13</td><td>39</td><td>01</td><td>37</td><td>01</td><td>20</td><td>01</td><td>42</td><td>0</td><td>42</td></td<>	8 35	13	37	15	41	18	36	13	39	01	37	01	20	01	42	0	42
37       15       40       17       44       20       39       15       42       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       47       12       44       19       49       15       47       12       47       14       44       15       44       15       44       15       44       15 <td< td=""><td>96 6</td><td>14</td><td>38</td><td>91</td><td>43</td><td>19</td><td>37</td><td>14</td><td>41</td><td>=</td><td>40</td><td>=</td><td>54</td><td>=</td><td>45</td><td>=</td><td>4</td></td<>	96 6	14	38	91	43	19	37	14	41	=	40	=	54	=	45	=	4
39       16       42       18       45       21       40       16       44       13       44       13       61       13       49       13         40       17       44       19       47       20       48       23       43       17       46       14       47       14       64       14       47       14       64       14       47       14       64       14       47       14       49       14       49       14       49       14       49       15       64       14       47       14       49       15       64       14       47       14       49       15       64       14       47       14       49       16       49       16       44       19       49       16       49       13       49       13       44       13       64       17       74       17       74       17       74       17       74       17       74       17       74       17       74       17       74       17       74       17       74       18       74       18       74       18       74       18       74       18       74 <t< td=""><td>0 37</td><td>15</td><td>\$</td><td>17</td><td>44</td><td>20</td><td>39</td><td>15</td><td>42</td><td>12</td><td>42</td><td>12</td><td>57</td><td>12</td><td>47</td><td>12</td><td>4</td></t<>	0 37	15	\$	17	44	20	39	15	42	12	42	12	57	12	47	12	4
40       17       44       19       47       22       42       17       46       14       47       14       52       42       17       46       14       47       14       64       14       52       14         43       18       45       20       48       23       43       18       48       15       49       15       57       16         45       21       50       23       52       26       47       21       53       18       48       15       67       15       54       15         47       22       52       26       47       21       53       18       48       15       67       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       71       16       72       72       72       72       72       72       72       72       72       72	1 39	91	42	18	45	21	9	91	4	13	4	13	19	13	49	13	48
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43       19       47       21       49       24       44       19       49       16       51       16       51       16       51       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       54       17       59       17         46       23       52       24       55       25       24       55       19       88       19       81       19       64       18         49       24       25       25       26       20       51       17       54       17       54       17       54       17       59       17         51       25       26       26       20       61       20       61       20       61       62       20       61       20       61       62       17       59       17       18       11       18       61       18       18       11       18       19       64       19       40       12       20       61	3 41	18	45	20	84	23	43	18	48	15	49	15	19	15	¥	15	53
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45       21       50       23       52       26       47       21       53       18       56       18       78       18       61       18         47       22       52       24       53       27       49       22       55       19       58       19       81       19       64       19         49       23       54       26       29       51       23       56       20       61       20       84       20       64       19         51       25       27       57       30       53       24       58       21       63       21       63       21       64       19         54       27       61       29       31       54       26       60       31       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64       19       64		20	49	22	51	25	46	20	51	17	25	17	74	17	65	17	57
47       22       52       24       53       27       49       22       55       19       58       19       81       19       64       19         48       23       54       25       28       50       23       56       20       61       20       84       20       66       20         51       25       26       26       23       55       28       50       23       56       20       61       20       84       20       66       20         54       26       59       28       59       31       54       26       62       21       63       21       88       21       68		21	20	23	52	97	47	21	53	81	8	18	78	81	19	18	89
48       23       54       25       55       28       50       23       56       20       61       20       84       20       66       20         49       24       56       26       29       51       24       58       21       63       21       88       21       68       20         51       26       29       31       54       26       60       31       63       21       88       21       68       <		22	52	24	53	27	64	22	55	19	28	61	81	61	2	19	62
49       24       56       26       56       29       51       24       58       21       63       21       88       21       68       21       51       25       57       27       57       30       53       25       60       31       54       26       60       32       56       50       27       63       51       68       21       68 <td< td=""><td></td><td>23</td><td>*</td><td>25</td><td>55</td><td>28</td><td>20</td><td>23</td><td>99</td><td>20</td><td>19</td><td>20</td><td>2</td><td>20</td><td>98</td><td>20</td><td>\$</td></td<>		23	*	25	55	28	20	23	99	20	19	20	2	20	98	20	\$
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52     26     59     28     59     31     54     26       55     28     60     32     56     27       56     29     64     31     63     34     58     29       59     64     31     63     34     58     29       59     66     32     64     35     60     30       60     34     67     37     63       64     36     70     39     65       64     40     67     40     67       66     40     67     44     77       68     44     77     70		25	57	27	57	30	53	25	09								
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Table A6. T-Score Conversion Tables for Female Air Force Recruits

1	. 1	1	1	=		3	:	1		3		1	-	1	1	•	-
20         41         20         41         20         41         20         41         20         41         20         41         20         41         20         41         20         41         20         41         20         41         20         42         42         43         43         43         43         43         43         43         44         45         46         45         45         45         45         45         45         46         47         48         48         47         48         48         48         47<		2	-		-	-	-	1	-	1	-	3	-	3	-	-	-
23		20	\$	20	=	20	36	15	12	2	32	15	12	15	38	15	*
2.2         4.1         2.2         4.2         2.2         4.2 <td>2</td> <td>77</td> <td>7</td> <td>71</td> <td>42</td> <td>21</td> <td>37</td> <td>91</td> <td>7</td> <td>21</td> <td>33</td> <td>91</td> <td>83</td> <td>91</td> <td>9</td> <td>91</td> <td>36</td>	2	77	7	71	42	21	37	91	7	21	33	91	83	91	9	91	36
23         45         23         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         18         33         33         34         35         34         35         34         35         34         35         34         35         34         35         34         35         34         35         34         35         34         35         34         34         35         34         34         35         34<	9	22	=	22	\$	22	37	11	16	22	*	11	8	11	41	17	37
24         45         24         45         24         45         24         45         24         45         24         45         24         45         24         45         24         45         25         45         25         45         25         45         25         45         25<	-	23	42	23	45	23	38	18	18	23	*	18	31	18	42	18	38
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28         46         28         33         34         45         28         33         34         45         34         34         34         34         34         34         34         34         34         34         34         34         34         34         34         34<		22	45	27	64	27	7	22	25	27	38	22	37	22	4	22	4
33       56       57       58 <td< td=""><td></td><td>28</td><td>*</td><td>28</td><td>5</td><td>28</td><td>42</td><td>33</td><td>36</td><td>28</td><td>30</td><td>23</td><td>38</td><td>33</td><td>48</td><td>23</td><td>45</td></td<>		28	*	28	5	28	42	33	36	28	30	23	38	33	48	23	45
33		2	4	200	: 5	2	43	34	280	2	9	4	200	34	40	74	*
31       56       57       58 <td< td=""><td></td><td>2</td><td>4</td><td>30</td><td>2</td><td>30</td><td>**</td><td>36</td><td>2 5</td><td>3 9</td><td>41</td><td>35</td><td>41</td><td>36</td><td>\$</td><td>36</td><td>48</td></td<>		2	4	30	2	30	**	36	2 5	3 9	41	35	41	36	\$	36	48
33       50       53       54       55       53       54       55       53       54       55       53 <td< td=""><td></td><td>=======================================</td><td>9</td><td>3 2</td><td>3</td><td>3 2</td><td></td><td>3 %</td><td>2 2</td><td>3 2</td><td></td><td>3 %</td><td>42</td><td>3 %</td><td>3 5</td><td>3 %</td><td>40</td></td<>		=======================================	9	3 2	3	3 2		3 %	2 2	3 2		3 %	42	3 %	3 5	3 %	40
33       51       53       54       53       54       51       53       54       51       53       54       51       53       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54       51       54 <td< td=""><td></td><td>3 2</td><td>9</td><td>32</td><td></td><td>33</td><td>*</td><td>3,0</td><td>33</td><td>33</td><td></td><td>3 5</td><td>77</td><td>3 5</td><td></td><td>3 6</td><td>2</td></td<>		3 2	9	32		33	*	3,0	33	33		3 5	77	3 5		3 6	2
33	, ,	33	3 5	32	3 5	33	**	100	36	33	7.7	100	*	100	3 5	170	2 5
35       51       36       34       37       34       35       34       35       34       35       34       35       34       35       35       35       35       35       37       34       35       35       35       37       37       34       35       34       35       34       35       35       37 <td< td=""><td>0 1</td><td>? ?</td><td>2:</td><td>3 :</td><td>25</td><td>33</td><td>9 !</td><td>97</td><td>33</td><td>3</td><td>3:</td><td>97</td><td>£ :</td><td>87</td><td>55</td><td>97</td><td>76</td></td<>	0 1	? ?	2:	3 :	25	33	9 !	97	33	3	3:	97	£ :	87	55	97	76
37       37       39       35       47       30       38       45       30       38       45       30       38       45       30       38       45       30       38       45       30       38       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       30       48       48       33       48 <td< td=""><td>- (</td><td>*</td><td>7 5</td><td>4 :</td><td>3,5</td><td>4 :</td><td>41</td><td>53</td><td>37</td><td>4</td><td>4 :</td><td>23</td><td>\$</td><td>62</td><td>*</td><td>2</td><td>53</td></td<>	- (	*	7 5	4 :	3,5	4 :	41	53	37	4	4 :	23	\$	62	*	2	53
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42       58       42       67       42       53       37       51       42       51       37       57       37       64       37         43       59       43       69       43       54       38       52       43       55       38       58       38       65       38         44       59       44       55       39       54       44       53       39       60       39       66       39         46       61       46       72       46       56       41       58       44       63       49       57       41       66       39       66	3	4	57	41	99	41	52	36	49	41	20	36	98	36	63	36	63
43       59       43       69       43       54       38       52       43       52       38       58       38       65       38         44       59       44       70       44       55       39       54       44       53       39       60       39       66       39         45       60       45       71       45       55       40       56       41       53       39       60       39       66       39         46       61       46       72       46       56       41       58       41       67       40       61       40       61       40       67       40         48       61       46       56       41       58       44       60       41       68       41       64       40       61       40       67       40         49       64       59       47       56       43       66       43       66       44       41       43         50       64       50       59       45       64       50       54       44       46       50       44       45       64       40	4	42	. 58	42	19	42	53	37	51	42	51	37	57	37	\$	37	2
44       59       44       70       44       55       39       54       44       53       39       66       39       66       39         45       60       45       71       45       55       40       56       45       54       40       61       40       67       40         46       61       46       72       46       56       41       58       46       55       41       68       42       64       42       69       42       64       42       69       42       64       42       69       42       64       42       68       <	4	43	59	43	69	43	2	38	52	43	52	38	58	38	65	38	65
45       60       45       71       45       55       40       56       45       54       40       61       40       67       40         46       61       46       72       46       56       41       58       46       55       41       63       41       68       41       64       40       61       40       67       40         48       63       48       73       47       77       42       59       47       55       42       64       42       69       41       43       44       68       44       42       69       42       64       40       61       40       67       40         49       64       58       43       61       48       56       43       64       44       72       44         50       64       50       58       44       63       49       57       44       66       44       72       44         50       64       50       58       45       64       50       58       45       68       45       73       45         51       65       51       52	5	4	89	4	20	4	55	39	54	4	53	39	09	39	8	39	67
46       61       46       72       46       56       41       58       46       55       41       63       41       68       41         47       62       47       73       47       57       42       59       47       55       42       64       42       69       41         48       63       48       74       48       58       43       61       48       56       43       64       40       40         50       64       50       76       49       58       44       63       49       57       44       66       44       72       44         50       64       50       59       45       64       50       58       45       68       45       73       45         51       65       51       78       45       64       50       58       45       68       45       73       45         52       66       52       79       52       61       53       61       53       61       53       45       68       45       73       45         53       67       53       83	9	45	09	45	71	45	55	40	56	45	¥	4	19	9	19	9	89
47       62       47       73       47       57       42       59       47       55       42       64       42       69       42         48       63       48       74       48       58       43       61       48       56       43       65       43       71       44         50       64       50       76       49       58       44       63       49       57       44       66       44       72       44         50       64       50       59       45       64       50       58       45       68       45       73       45         51       65       51       70       52       61       53       60       53       60       53       60       53       60       53       61       53       60       53       61       53       60       53       61       53       61       53       61       54       62       53       61       53       62       53       62       53       62       63       63       63       63       63       63       63       64       53       64       53       64	1	46	19	46	72	46	26	41	58	94	55	41	63	41	89	4	69
48       63       48       74       48       58       43       61       48       56       43       65       43       71       43         49       64       50       58       44       63       49       57       44       66       44       72       44         50       64       50       59       45       64       50       58       45       68       45       73       45         51       65       51       79       52       61       52       60       51       59       45       64       50       58       45       73       45         52       66       52       79       52       61       52       60       53       61       53       61       53       61       53       61       53       61       53       61       54       61       54       61       53       62       53       62       54       61       54       62       54       62       54       62       54       62       64       56       63       64       56       64       56       64       56       64       57       64	80	47	62	47	73	47	57	42	89	47	55	42	2	42	69	42	71
49       64       49       76       49       58       44       63       49       57       44       66       44       72       44         50       64       50       77       50       59       45       64       50       58       45       64       77       44         51       65       51       79       52       60       51       59       45       64       50       58       45       64       77       48         52       66       52       79       52       61       52       60       53       61       53       61       53       61       53       61       54       61       54       61       54       61       54       61       54       61       55       62       55       62       55       62       55       63       55       63       55       63       55       63       55       64       55       64       55       64       55       64       55       64       55       64       55       64       55       65       64       55       65       64       55       65       64       55	6	48	63	48	74	48	88	43	19	84	98	43	65	43	71	43	72
50       64       50       77       50       59       45       64       50       58       45       68       45       73       45         51       65       51       78       51       59       45       64       50       58       45       73       45         52       66       52       79       52       61       52       60       53       61       52       60         54       68       54       62       54       61       54       61       54       61         55       69       55       84       56       64       56       63       55       63       55       63       55       63       55       63       55       63       55       64       56       64       56       64       56       64       57       64       57       64       56       57       64       56       56       64       57       64       56       56       64       56       56       64       56       66       56       56       66       56       56       66       56       66       56       66       56       66	0	49	3	49	9/	49	28	44	63	49	57	4	98	4	72	4	73
51       65       51       78       51       60         52       66       52       79       52       61       52       60         53       67       53       80       53       61       52       60         54       68       54       82       54       61       53       61         55       69       55       83       55       63       55       62         56       69       56       84       56       64       56       63         57       70       57       85       65       55       65         59       72       59       88       59       66       59       66         59       72       50       66       59       66       59       66	15	20	2	20	11	20	59	45	2	20	28	45	89	45	73	45	75
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57     70     57     85     57     65     57       58     71     58     86     58     65     58       59     72     59     88     59     66     59       50     72     59     88     59     66     59	9	26	69	56	2	99	64			26	63						
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19       44       21       49       24       41       19       44       16       61       16       66       16       57       16         20       46       22       50       25       42       20       46       17       63       17       70       17       59       17         21       48       23       51       26       44       21       48       18       65       18       73       18       61       18         23       51       25       54       28       46       23       51       70       70       17       59       17       70       17       59       17       70       17       59       17       70       18       61       18       66       10       70       17       59       17       18       13       11       18       51       18       51       18       51       18       51       18       51       18       51       18       51       52       52       52       52       52       52       52       52       52       52       52       52       53       53       53       53	4	18	42	20	47	23	40	18	42	15	58	15	63	15	25	15	53
20       46       22       50       25       42       20       46       17       63       17       70       17       59       17         21       48       23       51       26       44       21       48       18       65       18       73       18       61       18         23       51       24       53       27       45       22       50       19       68       19       76       19       64       19         24       53       26       57       59       47       24       53       20       70       20       80       19       76       19       64       19         25       55       29       47       24       53       21       70       70       70       80       70	46	61	4	21	46	24	14	19	44	91	19	91	99	91	57	91	55
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22       50       24       53       27       45       22       50       19       68       19       76       19       64       19         23       51       25       54       28       46       23       51       20       70       20       80       20       64       19         24       53       26       57       28       46       23       51       20       70       20       80       20       66       20         26       57       28       58       31       50       26       57       59       51       69       30       66       20       66       20       20       80       20       66       20       20       20       80       20       66       20       20       20       20       80       20       66       20       20       80       20       66       20       20       80       20       66       20       20       80       20       66       20       80       20       80       20       80       20       80       20       80       20       80       20       80       20       80	64	21	48	23	51	26	44	21	48	18	65	18	73	18	19	18	86
23       51       25       54       28       46       23       51       20       70       20       80       20       66       20         24       53       26       55       29       47       24       53       21       72       21       80       20       66       20         26       57       28       31       50       26       57       21       83       21       69       21         27       59       29       59       32       51       27       59       21       83       21       69       21         28       61       30       64       33       52       28       61       69       51       63       64       63       7       7       7       21       83       21       69       21       83       61       83       61       83       83       83       83       83       83       83       84       84       86       83       84       84       84       84       84       84       84       84       84       84       84       84       84       84       84       84       84 <t< td=""><td>90</td><td>22</td><td>20</td><td>24</td><td>53</td><td>27</td><td>45</td><td>22</td><td>20</td><td>61</td><td>89</td><td>61</td><td>9/</td><td>61</td><td>3</td><td>19</td><td>62</td></t<>	90	22	20	24	53	27	45	22	20	61	89	61	9/	61	3	19	62
24     53     26     55     29     47     24     53     21     72     21     83     21     69     21       26     57     28     58     31     50     26     57     59     21     83     21     69     21       27     59     59     33     51     27     59     53       28     61     33     64     34     54     59     63       30     64     32     63     36     65       34     66     37     57       40     61       41     62       43     65       44     66	52	23	51	25	54	28	46	23	51	20	70	20	80	20	99	20	49
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